Visualisation design

Target Audience:

The target audience my app is designed to help are families and small businesses that can be affected by the price fluctuations of oil and gas.

"Families and small businesses are currently struggling due to the increased costs of oil and gas especially during the winter period, and this results in a lower standard of living since they will have to worry more about how they spend money. This is an expense issue as it results in decreased sales, stifling economy growth as well as increasing expenses for the public."

Questions:

Does the price of oil and gas trend similarly to each other?

Does the daily fluctuation in price follow a similar gradient trend to the monthly fluctuation of price?

Do prices in winter fluctuate significantly more/less compared to the rest of the year?

Are there any spikes that do not follow any pattern/trend, such as spiking outside of winter?

Dashboard design

Visualisations

Because I have multiple datasets, each with the same format of a Date column and Price column, I can use a line graph to present this data. The use of this data will be for showing the trend in oil and gas prices over time, as well as allowing users to analyse the trends that may occur over certain periods of time, and for these purposes, a line graph would be a good choice as it caters to these conditions. [1] States "When you have time-series data with very granular time intervals (e.g. daily vs monthly) this is usually … a strong signal to use a line chart" – this is to help reduce visual clutter and displaying too much data at once, which could confuse the user on what they are looking at. If we were to use a bar graph like the example given in [1], the bars would be extremely thin and hard to read, given that our time interval is days/months over the course of decades, and this would also make it difficult for the user to compare trends with other graphs, as the bars would overlap and cause more clutter.

Another visualisation that could be used is a histogram, with each bar representing a month, and the frequency (y axis) representing how many times the maximum/minimum resource price occurred in that month, over the entire data set. This is useful for determining when the spikes in price were most likely to occur, or when the prices of oil and gas were cheapest, which can be useful for the target audience especially. The use of histograms in this nature is explained in [3], as "Histograms are useful exploratory data visualizations for spotting outliers, skew, bimodality, and other shape features". This means we can use histograms to spot potential trends, such as whether there is a positive skew towards the winter region (around Nov-Feb), or if there are any significant outliers.

Page design

The format of the dashboard would also be important to allow the user easy access to the graphs required, which could be done through a multi-page dashboard, separated into "Oil" and "Gas", paired with the appropriate headings. The graph colours are also important and should not distract

the user from the trends, so a simple colour scheme such as black/white/blue would be sufficient, ensuring that colours are kept consistent so as to not be confusing. Grid lines can also be used to help the user evaluate the price of the resource at specific points in time.

Evaluation

Does the price of oil and gas trend similarly to each other?

My app should allow users to compare multiple graphs are once, through overlaying figures on the same graph. This could be done through a prompt next to the graph, giving the user an option to overlay the graph with another figure (which they would select inside the prompt).

However, some important considerations would be to ensure the figures are in different colours and that they share the same scale for pricing to keep the information accurate. This is important when creating graphs, and this sentiment is shared in [2], where Cairo states "when you design a graphic to explain something, getting the information right comes first". He also explains the importance of how we present the data to ensure there is so miscommunication; "What you design is never exactly what your audience ends up interpreting, so reducing the chances for misinterpretation becomes crucial". By making choices like keeping the scale consistent, I can reduce the chance of misinterpretation, and therefore help users make better judgement on trends and prices presented.

Do prices in winter fluctuate significantly more/less compared to the rest of the year?

To address this question, I can allow the user to "zoom in" on a specific year, allowing them to see more precise trends over the course of the months/days in the year. I could implement this using a dropdown menu allowing the user to select a specific year, and provide an interactive graph that will change the time axis to reflect the year the user chose. There could also be additional features provided on the graph itself, such as zooming in manually, or turning on/off markers to show where the points are.

Are there any spikes that do not follow any pattern/trend, such as spiking outside of winter?

By using the histogram visualisation, this question can be addressed, as it allows the user to see around which months/seasons spikes most frequently occurred, and can determine if there is any trend to when the spikes occur.

References:

[1] Tracy, S. (2020) Covid-19 in charts: Examples of good & bad data visualisation. Analythical by Stephen Tracy - Available at: https://analythical.com/blog/covid19-in-charts (Accessed: February 14, 2023).

[2] Cairo, A. (2020) The truthful art: Data, charts, and maps for communication. Berkeley: New Riders.

[3] Nuzzo, R.L. (2019), Histograms: A Useful Data Analysis Visualization. Journal of Injury, Function and Rehabilitation, 11: 309-312. https://doi.org/10.1002/pmrj.12145